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PEDIATRIC UTILIZATION PATTERNS AND THEIR CORRELATES IN THE YALE HEALTH PLAN

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TABLE OF CONTENTS

INTRODUCTION

The problems of providing effective and efficient delivery of comprehensive health care to the entire population have been coming into increasing prominence in the last few years as it has become more and more apparent that present methods are failing to provide optimum health care to large segments of the population. One of the proposed solutions has been the prepaid group practice program, and efforts to establish a nationwide series of Health Maintainance Organizations have made this approach an important part of national health policy. The Kaiser-Permanente System, the prototype of prepaid group practices, as well as a number of other independent programs, has been in successful operation for many years, and the number of programs of this type has been growing steadily. In 1971, prompted by a study at Stanford University which indicated that students and their families were receiving surprisingly inadequate medical care and particularly inadequate preventive care,[1,2] Yale University opened the Yale Health Plan, a group practice designed to provide prepaid comprehensive care to the entire university community.

In its first year of operation the Yale Health Plan encountered an unexpectedly high demand for services, creating long waiting lists for appointments. Perhaps as a result the proportion of walk-in visits climbed to about a third of all visits and over half of the pediatric visits. This in turn resulted in crowded waiting rooms and long waiting times even for those with appointments. New staff were hired, some changes were made in appointment procedures, and by the end of the first year the Yale Health Plan seemed to have the major problems under

control. Enrollment continued to increase and the new program seemed successfully launched. Some problems remained, however; the proportion of walk-in visits continued to be high, the number of unnecessary visits also remained high in the opinion of some staff members, and many both inside and out of the program were unconvinced that this type of approach could be successful in the long run.

A number of important issues have been raised by the YHP experience, and these issues are basic to the questions of how best to deliver health care and whether the prepaid comprehensive approach is in fact an efficient or even viable answer on either a community or a national level. Critics of this approach charge that comprehensive prepaid programs encourage, and indeed may inevitably result in, over-utilization and abuse of services, swamping available manpower and forcing costs rapidly upward. Proponents of comprehensive programs on the other hand are discouraged by their relatively low rate of acceptance by consumers and by the fact that many subscribers fail to take full advantage of such programs, particularly of the preventive services offered. Clearly though, before a final conclusion can be reached the YHP experience needs to be examined more closely and considered in the light of previous experience with other similar plans.

This study examines the Yale Health Plan in the context of patterns of health care delivery and utilization in this country and then focuses on a segment of the YHP membership to determine specific patterns of utilization and their correlates, again in comparison with other health care systems. The pediatric group was chosen because standards of preventive care are fairly well-defined and known to the public for this group. In addition this group seemed to offer both

frequent acute illnesses and opportunities for over-utilization by anxious parents. This group had the largest number of walk-in visits. A limited age range (3-11) was chosen to control some of the visit variables; frequent well-baby visits and immunizations are largely completed by age three, and adult-type disease patterns have not yet superseded childhood diseases by age eleven. This age range accounts for about 40% of all visits to pediatricians nationwide.[3] Once it is determined what types of subscribers are most likely to utilize the program in specific patterns, a more rational determination can be made as to whether existing patterns are desirable or optimal and what changes might be advisable. The information obtained will be useful not only in assessing and solving some of the specific problems within the Yale Health Plan, but also in assessing and planning for future health care delivery in this country.

* * *

The concept of prepaid group practice is not new; the Mayo brothers established a group practice clinic in 1883, and Henry Kaiser added prepayment in the 1930's with the beginning of the Kaiser-Permanente system. The idea, a seemingly obvious solution both to the increasing fragmentation and cost of comprehensive care faced by the consumer and to the increasing body of knowledge and need for specialization faced by the physician, can scarcely be said to have spread like wildfire. By the mid-1960's approximately 150 independent prepaid group practice plans covered about two million members, with the Kaiser-Permanente Group and the Health Insurance Plan of Greater New York (HIP) together accounting for almost half the total.[4] Most of the plans service only 10-15% of those eligible. Even the most successful plans have a relatively

high rate of use of outside services. In some states legal barriers have hindered programs; the medical establishment has not been overly enthusiastic about prepayment arrangements, and employers or unions are often reluctant to renegotiate their existing health packages, but certainly a strong favorable reaction from health care consumers could overcome these barriers. Strong popular support, however, has not been forthcoming. The prepaid group, whether publicly or privately financed, appears to be the direction medical care will take in the future, and the reasons behind its lack of widespread acceptance up to the present time are vitally important. Closer examination of subscriber and non-subscriber reactions to existing plans may be helpful in elucidating some of these reasons.

Most prepaid group plans are offered to a selected population most often defined by association with a particular employer or union; an alternative program, usually Blue Cross-Blue Shield or a similar insurance plan operating on a fee-for-service basis, is offered in most cases. The majority, and usually 60% or more, select the fee-for-service option.[4] In some plans initial selection of the prepaid option may be as low as 10%. The Yale Health Plan attracted an initial non-student enrollment of about 25%.[5] The relatively poor showing of prepayment options may be due in part to a bias toward the pre-existing insurance when a prepaid program is introduced, and Donabedian in reviewing a number of programs, concluded that in general where both choices were introduced simultaneously the enrollment was about equally divided between them.[6] Lack of information may play an important role in the initial acceptance of a new program as well; one-third of Blue Cross-Blue Shield members eligible for Detroit's Community Health Association

were unaware of the existence of such a plan and of their own eligibility for it.[7] Freidson has suggested that a "lay-referral system" of relatives, neighbors, and friends is important in the choice and evaluation of one's doctor and that the group programs are largely outside this system.[8] This may well contribute to the lack of knowledge of group availability since patients hear of it only from their coworkers, a source of information that, in Detroit at least, failed to reach one third of potential subscribers. There is no evidence that in a small community such as Yale, however, where YHP is strongly supported by the university that lack of information influenced the initial enrollment.

Those who join prepaid plans do so for generally pragmatic reasons but ideological considerations may influence those who do not join. Comprehensive benefits, convenience of everything in one place, and freedom from out-of-pocket expenses are reasons frequently given for joining a prepaid group. The promise of ultimately lower costs is also a consideration - the National Advisory Commission on Health Manpower found that members of the Kaiser-Permanente Program paid 20-30% less over a five year period than the national average for comparable medical services.[9] Those who elected to keep other insurance did so most often because it gave them greater freedom to choose their physician[6] although this was a consideration frequently related to a specific physician with whom the patient was familiar rather than to political philosophy. The Yale community reacted to YHP with similar considerations. The most frequently cited reason for joining the Health Plan was the comprehensive coverage provided; cost and convenience were also major considerations. YHP enrollees were often new to the New Haven area and consequently had not established long-term relationships with

non-member physicians. Interestingly the university setting produced a number of YHP enrollees who cited support for the philosophy of prepaid comprehensive care as a major reason for joining. On the other hand, the lack of freedom to choose a physician, both on the primary care and specialist levels, was the most common reason for not joining YHP. Adequacy of present coverage, inconvenience to those living far away from the clinic, and higher YHP cost were other reasons commonly given for not enrolling.[5]

Those who choose prepaid options often do so on a trial basis, with many reservations about their selection. Almost half the YHP enrollees surveyed just before the opening of the plan expressed doubts about the program. These reservations were largely with respect to the inadequacies of the coverage (dependents over 18 years were excluded), fear that the coverage would be reduced, and fear about the quality of care. There was considerable fear that the program would be impersonal, that a clinic atmosphere would prevail, that waiting times would be long, and that the physician turnover rate would be high. In general subscribers were concerned more about the personal than the technical quality of the care they would receive under the new program. Those who elected to retain their Blue Cross coverage on the other hand expressed relatively few reservations about their choice.[5] These initial concerns are common to health plan subscribers in other plans as well but they tend to disappear with time; Bashshur found that Detroit workers who joined CHA on a trial basis were quite satisfied with their choice after three years.[10] In particular group subscribers are satisfied with the technical quality of care they receive. Freidson's survey of HIP subscribers found that patients appreciated the advantages of centralization of services, readily available specialist

consultations and laboratory facilities, and felt that prepayment encouraged good preventive care as well as early attention to health problems;[8] this finding has been the experience of most other plans as well.[4]

The fear of impersonal treatment in a charity clinic atmosphere expressed by the YHP subscribers, however, unlike their fears of poor quality care, is supported by the opinions of a great many otherwise satisfied members of other health plans. Donabedian felt that "in contrast to its enhancing effect on the perception of quality, group practice by its very mode of organization appears to have a negative effect on perceptions of personal interest and concern attributed to the plan in general and the physician in particular."[6] Freidson found that prepayment was often seen as a disadvantage in an individual doctor-patient encounter; the patient felt he was regarded as a charity case by the physician because he did not pay directly for the services, and was at the same time regarded as a "captive" patient so that the physician's incentive to try to please him was thereby weakened.[8] These fears were not without some basis in fact - McElrath found that HIP physicians tended to believe that their HIP patients were worse off financially than the average patient and that they more often over-utilized medical services than the fee-for-service patients. In fact, McElrath reported, HIP patients were slightly better off economically and had about the same utilization rates as the general population.[11] The HIP members interviewed by Freidson also complained of the impersonal atmosphere in the group practice clinics; the centralized, bureaucratic organization that produced the technical advantages and the great efficiency of the service at the same time inevitably produced a lack of intimacy, a lack of accommodation to the patient's individual

needs, and a lack of direct access to the patient's doctor, in short produced a "clinic" atmosphere. The unfortunately rapid turnover of physicians was another factor contributing to both to the impersonal atmosphere and to the failure of many patients to establish a personal relationship with their plan physician.[8] Up to one third of prepaid group subscribers do not consider the plan physician to be their family or regular doctor.[6] This is to some extent a function of previous experience, of course. For patients who have never had a family doctor and have obtained their previous care from clinics and emergency rooms, the comprehensive programs offer a personal on-going relationship with a physician and are greeted enthusiastically. This has often been the experience of neighborhood health centers. By and large, patients tend to remain enrolled in health care plans in spite of these problems but undoubtedly many others are kept from enrolling by their accurate fears of competent but impersonal health care.

The private practitioner in contrast to the health plan physician is seen as far more personable and ready to accommodate to the patient's needs; he is the most common reason cited by potential subscribers for not joining a health plan and he is the reason for a great deal of care received outside the plan by subscribers. In spite of basic satisfaction with prepaid programs and the care received therein, a high percentage of subscribers receive some of their health care at one time or another from sources outside the program; often such care is at their own expense. 39% of Detroit's CHA members, although satisfied with the program, had been to an outside doctor within three years of enrolling.[10] 23% of the total care for St. Louis's LHI members[12] and 16% of total care for Kaiser plan members[13] was provided by outside

sources. Freidson reported that outside use increased with the length of time enrolled; 32% of HIP subscribers with less than two years enrollment had used outside physician's services compared to 50% of those with four or more years of enrollment. More significantly, about 10% of subscribers used outside services regularly, regardless of length of enrollment. Again the most frequent reasons for outside use were previous experience with a physician outside the plan, dissatisfaction with the plan, and the greater accessibility or convenience of outside services. Patients who used outside services in the HIP study were more likely than others to be of a higher educational and occupational level and were more sensitive to the clinic atmosphere and to their supposed treatment as charity patients. Freidson concluded that "it does not seem to be the doctor-patient relationship that is responsible for the regular use of outside services so much as the accommodation of the practice of the entrepreneurial physician to the personal affairs of the patient."[8] Donabedian, in reviewing studies of several plans, however, felt the patient's relationship with an outside physician was more important:

> Persons who have a regular physician with whom they are satisfied are less likely to choose a prepaid group practice when an alternative plan that permits free choice of physician is offered. Should they join a prepaid group practice plan they are less likely to be satisfied with services offered by the plan and are more likely to get outside care, often from the physician they knew before they joined. To some extent consumer acceptance of prepaid group practice plans is an expression of the absence of a prior patient-physician relationship or the breakdown of such a relationship.[6]

It is apparent, then, that reluctance to disrupt pre-existing relationships with physicians and in some cases inadequate spread of information figure prominently in the failure of the majority of

consumers to accept prepaid group practice care. In those who take advantage of such plans these considerations are outweighed by the practical factors of cost, convenience, and comprehensive benefits, but there remain a great many sources of dissatisfaction nonetheless. A large share of complaints voiced by consumers are due to factors that seem to be intrinsic to prepaid group practice: impersonal treatment, rapid physician turnover, and inflexibility to the individual needs of the patient. This dissatisfaction results in a relatively large share of subscriber care being given by outside sources. In all fairness it must be noted, however, that patients of entrepreneurial physicians are not entirely satisfied with the service they receive either. A Temple University study in 1971 reported that 43% of those surveyed were dissatisfied with the availability of care outside usual office hours and 38% were unhappy with the waiting time in offices; in addition 10% thought the technical quality of care was poor.[14] Thus in spite of areas of dissatisfaction, not all of which are unique to prepaid groups, the majority of group subscribers are basically content with their medical care programs and in fact the more they are exposed to them the more satisfied they become.[10]

The opinions and concerns of the health care consumers, however, are strikingly different from those of the health care providers. Here the concern is not so much for the loss of on-going doctor-patient relationships or depersonalized treatment but rather for over-utilization, abuses, and rising cost. It is a widely held assumption in the politics of health care delivery that the fee-for-service is the major bulwark against a myriad of minor health problems, trivial complaints, and epidemic hypochondria that would otherwise flood

physicians offices. This is the major argument advanced against any form of national health service but it is usually assumed to apply to private prepaid programs as well. In addition it is often alleged that existing prepaid programs attract subscribers who are likely to use more medical care and that healthy patients are less likely to commit themselves to relatively large premiums if they are not assured of getting their money's worth. Data on the latter question are not abundant but Donabedian in reviewing the literature prior to 1965 concluded that there was no strong tendency for prepaid plans to attract an unhealthy population.[6] A later study in Columbia, Maryland did find subscribers to the Columbia Plan had a significantly greater incidence of health problems prior to joining than non-subscribers.[15] No data are available for the YHP population. The question of over-utilization has been studied somewhat more thoroughly in the various prepayment plans, however, and in no case has any evidence of extensive abuse of prepaid services been demonstrated.

In general studies of utilization in prepaid health plans indicate a somewhat higher utilization of out-patient services, particularly in the proportion of patients who see a physician at least once during a year, but a somewhat lower rate of hospitalizations, surgical procedures, and hospital days in the subscriber population than in comparable populations who receive fee-for-service care. Anderson and Sheatsley in a 1959 survey of HIP and GHI members found that HIP members had a significantly lower rate of hospitalizations and surgical procedures but that the rate of physician visits was about the same for both groups and that about one fourth of members of each group made no physician visits during the year.[16] Likewise a group practice

prepaid option for federal employees had consistently lower hospitalization and surgical rates and fewer hospitalization days than a corresponding Blue Cross-Blue Shield option[17,18] but had a higher outpatient utilization rate of 83% compared to 36% for fee-for-service members.[19] Initial reports from the Columbia Plan in Maryland found the hospitalization rate to be one-third the national average and the average length of hospital stay to be significantly shorter than the average, but outpatient visits were about twice the national rate.[20] In contrast a study of three health care plans for blue-collar union members found no difference in hospitalization rates but did report an increased number of office visits in the most comprehensive of the three programs; the three programs studied were in different areas of the country, however.[21] The findings in studies in the pediatric age range have been similar. Alpert and coworkers found that a program of comprehensive care for low-income families resulted in an increase in health visits but a decrease in sickness visits and hospitalizations.[22] The Columbia Project reported that children as well as adults had more ambulatory visits and fewer hospitalizations than the national average in the first six months of the program.[20] A four-man pediatric group in California instituted a prepayment program within its own private practice and encountered no significant difficulties with either overuse or rising costs.[23] In none of these studies was there any indication of a significant increase in trivial complaints or excessive use of services; the increase in per capita out-patient visits appeared in most studies to be due to an increased number of patients who saw a physician at all during the year rather than to an increased number of patients making many visits. Only the Columbia study, based on an

affluent population and a new program, reported ambulatory visits per patient to be much above the national average.

As experience in a number of programs indicates, what happens to utilization rates when a prepayment system is introduced is not so important as the reasons for and patterns of the change. An increase in physician visits may mean either that previous care was restricted to inadequate levels by financial or other considerations or it may mean that subscribers are determined to get their money's worth from the plan regardless of need. A decrease in hospitalization rates may mean either that unnecessary hospitalizations are being avoided because their financial incentive has been eliminated or that necessary hospitalizations are being denied to decrease the plan's operating expenses. Careful studies are lacking; Donabedian concluded from his review, however, that

> The available data on utilization are consistent with the notion that prepaid group practice through changing the nature of the incentives to the physician and/or introducing professional controls lowers the hospitalization rates for many surgical and non-surgical conditions. This effect seems fairly clear in relation to the common respriatory infections and the less severe surgical conditions in which there would seem to be a large element of discretion.[6] p.25

Alpert agreed that the patient's relationship with the comprehensive care physician allowed both to be more comfortable treating illness on an out-patient basis.[22] This is important in a program which stresses preventive care, as most prepaid programs do; utilization rates may be increased initially as a larger proportion of the service population is reached, but in the long run utilization rates may be lowered if the program is successful in reducing morbidity and catching diseases at early, uncomplicated stages amenable to treatment. Support for this

pattern is provided by the study by Alpert and colleagues where introduction of a comprehensive care program resulted initially in a big jump in health visits; these later leveled off to slightly more than the number of health visits for a control group which did not receive comprehensive care, but sickness visits were decreased significantly below the control group.[22] Obviously there are factors other than prepayment itself which influence utilization patterns, and these need to be further elucidated before prepayment group practice plans can be assessed in the proper perspective. A number of studies have in fact been done on utilization patterns; this discussion will be confined to those involving the pediatric age group.

The U. S. National Health Survey in 1957-58 found physician visits to be highly correlated, both with respect to number and type and at all age levels, with family income. Children under fourteen years with total family income of over $4000 made one-third more visits for diagnosis and treatment and nearly twice as many visits for preventive care as children from families with a total income of under $2000.[24] Only 10% of low-income children had seen a pediatrician in the survey year compared to 29% of high-income children.[25] This state of affairs has remained essentially unchanged over the last decade. The National Center for Health Statistics reported that in 1966-67, children under seventeen with family incomes over $7000 made 4.1 physician visits per year compared to 2.5 visits per year made by children with family incomes of less than $3000; the proportions of children who made no physician visits at all during the year were 26% and 47% respectively. Race was also highly correlated with the number of visits, with white children making twice as many physician visits per year as children of other

races, and a much larger proportion of white than non-white children seeing a physician at least once during the year (see Table 1).[26] No studies are currently available indicating to what degree the influence of race on utilization is independent of income.

Prepaid programs of course ought to eliminate the effects of income on the receipt of medical care although many programs, organized around employment groups, do not include patients with incomes in the lowest brackets. No studies are thus far available on differences in income and utilization within programs. A study of immunization status in New York City, on the other hand, indicates that perhaps cost of care is not the major reason for low-income persons having fewer health care visits: the New York City Department of Health found that only 51% of people under thirty with incomes under $2000 had full DPT immunizations while 91% of those with incomes over $8000 were fully immunized. The difference was even greater for smallpox vaccinations, and yet immunization was widely available within the city at no charge.[27] Beigner and Yerby in citing this study concluded that

> The New York City experience is compatible with what the English have learned after 15 years of experience with the National Health Service: the higher-income groups make better use of the Service; receive more specialist attention; occupy more of the beds in better equipped and staffed hospitals; receive more elective surgery; get better maternity care; and are more likely to seek psychiatric help than low-income groups.[27]

This experience may actually be more closely related to level of education than to level of income, and a number of national surveys have shown education to be an important variable independent of income. The 1966-67 health survey found for example that 54% of children from families where the parents had less than nine years of education had

TABLE 1

Effects of various parameters on physician visits and rate of utilization for children under 17, July,1966-June,1967, U.S.[26]

	% who saw a physician within 1 yr. of survey	physician visits per child per year
all children	68.0	3.6
race		
white	70.8	3.9
all others	52.5	2.0
sex		
male	69.0	3.7
female	67.1	3.5
family income		
<$3,000	52.9	2.5
$3,000-6,999	64.8	3.3
≥$7,000	74.0	4.1
years of education of head of family		
<9	54.3	2.3
9-12	69.1	3.7
≥13	80.7	4.8
geographic area		
northeast	74.3	4.1
north central	68.0	3.5
south	62.5	3.1
west	69.5	4.0

seen a physician during the year while 81% in families where the parents had thirteen or more years of education had seen a physician; the number of physician visits per child per year was also directly related to the number of years of education in the parents.[26] (see Table 1) It may well be that prepaid programs must take an active role in insuring that all their members are aware of the services that are provided and recommended by their plans if they are to overcome the barriers of income and education to optimum health care.

Other factors which were found by the 1966-67 survey to influence pediatric utilization were sex and geographic area; boys made slightly more visits than girls, and residents of the northeastern U.S. made more visits than residents of other regions.[26] Family size was also an important factor among Group Health Insurance subscribers in New York, with smaller families having a disproportionately high rate of utilization.[28] Other studies have shown age to be inversely related to use of services and a survey conducted by the Health Information Foundation in 1963 reported that "among all age groups, children under six are <u>most</u> likely to see a physician at least once. Children 6-17 are <u>least</u> likely to see a physician."[29] Salber and her coworkers, in studying utilization in a neighborhood health center, found age to be the predominant influence on utilization, and family size, race, income, and education of mother to be relatively unimportant.[30]

High quality preventive care in the form of a completed course of immunizations and frequent well-baby and well-child visits is regarded as essential to any medical care program for children. Pediatricians spend about half their time in well-child care and the proportion of their daily patient load seen for preventive care has been increasing

steadily;[31] New England leads the nation with 60% of pediatric visits for preventive care.[32] Although the doctrine of the yearly physical examination has recently been called into question, the American Academy of Pediatrics still recommends at least one visit per year after age three and more frequent visits for younger children.[33] Yet 32% of American children do not see a physician even once during an average year and this figure is much higher for low-income groups.[26] Not surprisingly, preventive care visits are correlated with much the same factors that influence over-all utilization. Lower socio-economic groups, lower parental levels of education, larger family size, and older age all adversely influence the amount of preventive care children receive.[27,28,34,35,36] Again lack of education and knowledge may be the most significant barrier, but a substantial barrier to preventive care may come as well from lack of acceptance of its need among patients. Podell found that women with lower educational levels were likely to reject the necessity of well-child care although they were also likely to be unaware of nearby preventive care facilities.[34] Gallagher found that although a smaller proportion of mothers in the lowest socio-economic class were aware of the oral polio vaccine, an even smaller proportion of their children had received it. He concluded that "many people whose care is substandard do not lack adequate knowledge. The principle barriers to better care lie in the realm of apathy and attitudinal resistance, situational obstacles, and inconvenient 'packaging' of health services."[36] Dodge and coworkers, however, in interviewing mothers of grade school children in Texas found no significant differences by race, socio-economic status, or educational level in maternal attitudes toward and desires for a number of preventive health care

measures; the actual utilization of such measures did vary significantly except in those measures, such as measles vaccine and TB skin tests, which had recently been emphasized in the community. These workers concluded that educational-promotional programs can indeed influence the patterns of preventive care utilization.[37]

Prepaid health care programs, then, appear to face their biggest challenge in the delivery of adequate preventive care. They have the potential for removing the income barriers, and for the poor at least, removing the reluctance to use public facilities by providing the patient with his own individual physician responsible for coordinating his comprehensive care. It is equally clear, however, that plans will have to educate their patients to the needs for and standards of preventive care. The study in the Boston neighborhood health center indicates this may be possible under the proper circumstances even with the most resistent low-income groups.[22]

It is an axiom in medicine that 10% of the population gets 90% of the disease; it is a challenge to prepaid programs to see that the ranks of this 10% are not swelled by hypochondriacs with trivial complaints. Although as discussed above there is no evidence that this is happening, there is some evidence that a group of patients with particularly high utilization rates does indeed exist. Densen and coworkers found that about 4% of the HIP population accounted for 25% of the total volume of physicians services each year, and that 12% of members account for 50% of services while at the same time 25% have no visits. Children had lower proportions at both ends of the spectrum than adults of various ages; 11% of children made 10 or more visits in a year and 20% made no visits. Over a three year period individuals

were likely to remain at the same level of utilization. About one-third of the high utilizers remained high utilizers from year to year but about one-fourth of the high utilizers became low or non-utilizers in the next year. Again children were less often consistent high utilizers. Densen was unable to find any common or identifying characteristics of the high utilizers; family size was related to low utilization but not to high utilization, and years of enrollment in HIP had no effect.[38] Avnet reported that 10% of GHI members accounted for 38% of claims and made seven or more claims each; this seems to be somewhat lower than reported for the HIP study since claims represented x-rays and laboratory procedures as well as physician visits.[28] Freidson reported only 22% of the HIP population in the Bronx had five or more visits, also lower than Densen observed.[8] 21% of the St. Louis LHI subscribers of all ages made ten or more visits, including dental visits.[12] Only Densen's study attempted to characterize the group or high-utilizers. In short, little is known about the small group of patients who account for such a large share of the services. Even less is known about the somewhat larger group of patients who account for none of the services. Yet some knowledge of which types of patients fall into which groups and why is necessary if any action is to be taken to bring them more into possession of both a reasonable amount of preventive care and a reasonable degree of self-sufficiency in handling perhaps minor health problems.

In summary, then, a number of health surveys have found a great disparity in the amount and type of health care various population groups receive. Family income and educational level appear to be directly related to the quanity and quality of both preventive and over-

all care; race, age, sex, family size, and poorly understood attitudes are also influential. Prepaid group practice programs have been able to create a more favorable attitude on the part of their patients toward obtaining preventive care and they may have been successful in reducing hospitalizations and illness visits significantly without raising overall utilization inordinately. Still, prepaid groups tend to be heavily weighted toward one income group, and whether they have actually been able to eliminate differences in utilization that accompany differences in income and related parameters has yet to be determined. It would appear from some of the studies discussed that such differences will not be eliminated automatically with prepayment but will require active encouragement and education of plan members. Ultimately some differences may be found to be secondary to varying illness rates or other factors not subjet to complete elimination; utilization differences based on sex appears to be one such case. Patients at the extremes of the utilization distribution need to be studied more carefully as well. Good comprehensive care requires that no one remain a non-user year after year, and it seems particularly important in large groups to encourage regular visits if for no other reason than to develop some semblance of an on-going doctor-patient relationship. The economics of prepayment groups require that the high users be kept to the minimum necessitated by need, and that heavy users with minor problems be identified and encouraged to become more independent.

The Yale Health Plan, a newly organized prepaid group practice in a unique university setting, provides an opportunity to study some of these factors more closely, to confirm the observations of other groups in a different type of population, to attempt to define subgroups with

specific utilization patterns, and to explore some of the areas of utilization that have not been well studied thus far. When more is known about various utilization patterns and their correlates, more rational approaches to the problems arising from those utilization patterns, whether on a local or national scale, prepaid or fee-for-service, can then be formulated.

MATERIALS AND METHODS

The project, as originally planned, was to be a study of utilization patterns and their correlates, both objective and subjective, for the entire pediatric service during the first year of YHP operation. This was to include multi-factoral analysis, with the aid of a computer, of the data already gathered and coded on the encounter forms filled out for each visit; these contained information on type of visit, presenting complaints, treatment and disposition for every visit made. In addition, interviews with member families were planned to attempt to determine subjective variables, including attitudes toward preventive care, previous patterns of pediatric care, and attitudes toward YHP, that might influence utilization patterns. Unfortunately, at the time the project was done, the former approach was no longer available for technical reasons and the latter approach was no longer available for policy reasons. Consequently the project had to be reduced considerably in scope to allow the less satisfactory, but at the time only acceptable, methods of random sampling and chart review to be substituted for the original approaches.

The population chosen for the study included all children on the July, 1972 enrollment list who had enrolled not later than October, 1972 and whose birthdates were between June 30, 1959 and July 1, 1968. From this group a random sample of 400 children was selected from the enrollment list using a random number table. The four month range in enrollment dates was necessary in order to include the student families whose enrollment started at the beginning of the school year. Use of the current enrollment list eliminated families who might have moved

away or withdrawn during the year. The necessity for using chart review for collecting data required that the population be of limited size to allow adequate sampling. The three to eleven age group was chosen to eliminate very young children who have frequent well-baby visits and adolescents who are apt to avoid or be avoided by pediatricians, and thus work with a group whose utilization patterns were subject to individual factors and yet involved a sufficient number of visits to facilitate meaningful comparisons.

All utilization patterns described were determined using this sample population of 400 children. Student children made up only 10% of this population, however, and since university status was one of the variables expected to influence utilization, it was necessary that more student children be included in the study. Accordingly the entire eligible student population of 139 children was used, bringing the total number of children studied to 502. This group was used for determining correlates of utilization patterns. The additional children thus added were generally younger and their parents were younger than the original sample group but their addition to the study group did not otherwise significantly alter any of the utilization patterns observed.

The demographic variables were obtained from the current enrollment list. These were age of child, age of parents, university status of parents (faculty, employee, or student), which parent was head of the plan, i.e. associated with Yale, number of months enrolled, and number of siblings also enrolled. No further information on income or educational level was available.

The utilization data was obtained largely from chart review. This information included the total number of visits, number of scheduled

pediatric visits, walk-in visits, after-hours visits, and specialist visits, reasons for initial visit (routine visit or specific problem), reasons for scheduled and unscheduled visits, number and length of hospitalizations, and presence of chronic conditions. Visits were checked against the appointment list for the day of the visit to determine whether an appointment had been made; visits not on the appointment list were counted as walk-in visits. For the last three months of the year a list was kept by the pediatrics department recording walk-in visits and whether or not the visit had been preceded by a telephone call; information from this list was used as well, but there were too few visits from this list included in the current study to make any meaningful comparisons between those who called before their visit and those who did not.

Walk-in visits and after-hours visits were classified by chief complaint, predominant symptom, or otherwise stated reason for the visits. Walk-in visits were judged by the reviewer to be non-urgent if they dealt with a minor problem that required no treatment other than reassurance, that could have been handled over the telephone, or that could easily have been scheduled in advance since a delay of a week or so would have been unimportant. A number of the visits classed as non-urgent, for example, were for rubella vaccines required by the school system; these were often handled by a nurse and did not take up much time but nonetheless could easily have been scheduled in advance.

Children with chronic conditions were divided into those with permanent conditions such as diabetes that might require many visits over a number of years, and those with transient conditions such as plantar warts that accounted for a significant proportion of their total visits

in one year but would be unlikely to result in heavy use over several years.

The data collected was coded, punched on cards, and analyzed by computer using the preprogrammed "Statistical Package for the Social Sciences".[39] Cross-tabulations, frequency tables, determinations of means, and computations of partial correlation coefficients were the major analytical techniques used. Most of the statistical analysis with the exception of the t-test determination of significance of differences between means was done by the SPSS system as well, and for this reason levels of significance are often given as exact values rather than as ranges. Unless otherwise stated significant results were associated with a p value of .05 or less. The formulae used for determining chi square distributions, population means and standard deviations, and partial correlations are detailed in the SPSS Handbook.

RESULTS

I. DEFINITION OF SAMPLE POPULATION

The random sample of 400 children was drawn from a total population of 1300 children aged 3-11 and enrolled for at least nine months by June 30, 1972. The demographic characteristics of this group are shown below and in Table 2; the characteristics for the full study group of 502 children are shown in Table 3.

A. Age: The mean age was 6.9 years and the ages were fairly evenly distributed throughout the age range. Employee children were slightly older than the mean and student children were slightly younger. Children from large families tended to be older than children from small families. Younger children tended to have younger parents than older children.

B. Sex: The group was about evenly divided between males and females.

C. Length of Enrollment: The mean length of enrollment was 11.5 months, with three-quarters of the group enrolled for 12 months.

D. Siblings: The mean number of siblings also enrolled in the plan was 2.2, with a mode of one sibling. Siblings over 18 were not on the enrollment list and the number of siblings may therefore be falsely low in some cases.

F. Parents: The mean age of the 327 individual fathers in the population was 35.1 years, with a range of 25 to 57 years and a median of 35.5 years; the ages of 13 fathers were unknown. The mean age of the 329 individual mothers was 35.2 years, with a range of 22 to 57 years and a median of 33.3; the ages of 10 mothers were unknown. In 88% of families the father was the parent associated with Yale and in 12% the mother was associated with Yale. University status is shown in

TABLE 2

Demographic Characteristics of Sample Population (n = 400)

	absolute frequency	relative frequency (%)
age (years)		
3 - 5	134	33.7
6 - 8	138	34.5
9 - 11	127	31.8
sex		
male	206	51.5
female	194	48.5
enrollment length (months)		
9	28	7.0
10	32	8.0
11	44	11.0
12	296	73.9
siblings		
0	25	6.3
1	149	37.2
2	141	35.2
3	57	14.2
4 or more	38	6.9
university status		
faculty	224	56.0
employee	140	34.9
student	36	9.0
father's age		
< 30	40	12.3
30 - 34	92	28.2
35 - 39	91	27.9
40 - 44	51	15.7
≥ 45	52	15.9
mother's age		
< 30	60	18.1
30 - 34	111	33.6
35 - 39	85	26.7
40 - 44	44	13.3
≥ 44	31	9.1

TABLE 3

Demographic Characteristics of Study Population (n = 502)

	absolute frequency	relative frequency (%)
age (years)		
3 - 5	177	35.3
6 - 8	177	35.3
9 - 11	148	29.5
sex		
male	264	52.5
female	239	47.5
enrollment length (months)		
9	80	15.9
10	39	7.8
11	49	9.7
12	334	66.4
siblings		
0	42	8.4
1	195	38.8
2	170	33.8
3	64	12.7
4 or more	32	6.4
university status		
faculty	224	44.6
employee	139	27.7
student	139	27.7
father's age		
< 30	71	18.4
30 - 34	112	29.0
35 - 39	98	25.3
40 - 44	52	13.4
≥ 45	54	14.0
mother's age		
< 30	74	20.2
30 - 34	128	34.9
35 - 39	89	24.3
40 - 44	45	12.3
≥ 45	31	8.4

Table 2.

II. UTILIZATION PATTERNS OF THE SAMPLE POPULATION

A. Total Visits: The sample population (Table 2) made a total of 1,232 visits during the first year of the Yale Health Plan. The mean number of total visits was 3.09; when this was adjusted for the length of enrollment the mean number of visits was 3.2 and the median was 2.39. Of those who made visits the mean was 3.65. The range was 0 to 29 visits. 15% of the population made no visits during the year, while 25% made more than 4 visits and 10% made more than 6 visits. The upper 10% accounted for nearly one-third of the total visits made, and half the visits were made by 20% of the population.

Of the visits made, 31% were scheduled pediatric visits, 40% were unscheduled daytime pediatric visits (walk-ins), 14% were after-hours or weekend visits, and 15% were visits to various specialists.

B. Scheduled Pediatric Visits: These accounted for 31% of the total visits in the study. The mean, adjusted for enrollment time, was 0.98 scheduled visits per year. 32% of the population made no scheduled visits and 18% made 2 or more. The great majority of visits were made for routine physical examinations (77%); 6% of the scheduled visits were for diagnosis or treatment of specific problems, 11% were for follow-up treatment of old problems, and 4% were for immunizations or allergy shots. The latter two categories do not reflect the actual number of visits made for shots or follow-up as many of these visits were technically walk-in visits and classified with that group. No separate record was kept of visits for social or psychological problems; these were few in number as far as could be determined from the charts

but undoubtedly a great deal of counceling was done in visits made ostensibly for other purposes.

C. Unscheduled Pediatric Visits (all hours): These accounted for 54% of the total visits and 64% of the pediatric visits. 73% were made during regular office hours, accounting for 56% of the pediatric visits during the day; 27% were made in the evenings or on weekends. The mean number of daytime walk-in visits adjusted for length of enrollment was 1.3. 42% of the population made no unscheduled visits while 31% made 2 or more.

All unscheduled visits were classed in one of ten categories according to the chief complaint or predominant symptom. 666 unscheduled visits were made by the sample group with the distribution as shown in Table 4.

TABLE 4

Distribution of Unscheduled Visits by Type

Trauma	11%
Rash	6
Fever/cough	7
Earache	15
Sore throat or throat culture	21
Pain	4
Other urgent	9
cold	6
follow-up of old problem	11
non-urgent	11

If the common cold was considered to be a relatively non-urgent cause for a pediatric visit, then about 28% of the unscheduled visits ought to have been either scheduled visits or non-visits; this included the follow-up visits as well as the colds and non-urgent visits. The other 72%, however, were all basically necessary in that definite symptoms,

of generally unpredictable onset and requiring medical consultation existed. Many of these visits were preceded by a telephone call to the YHP pediatrician and the patient was advised by him to come to the clinic; for most of the visits no record of telephone calls was available. In March, 1972 the pediatrics service began to keep a list of the number of walk-in visits made each day stating whether or not the patients had called before the visits. In April, for example, there were 308 walk-in visits during office hours for all ages; 239 or 78% were preceded by a telephone call. The service averaged 15.4 walk-in visits a day, of which an average of 12 were officially advised by one of the staff before the visit. The number involved in the sample was too small to determine whether visits with telephone calls were for different causes than visits without calls, but it was the reviewer's impression that they were not. Of the 106 visits in the study where the presence or absence of a telephone call was known, 90 visits were preceded by a call and only 16 were not.

D. Specialist Visits: Visits to YHP specialists accounted for 15% of all visits in the sample population. Only 30% of the sample made any specialist visits. The highest number of specialist visits made was 6. The eye service was the most frequently used specialty service, and 19% of the population saw either an ophthalmologist or an optometrist at least once during the year; most of these visits were for routine eye examinations or refractions. The eye service was the only pediatric subspecialty which accepted self-referrals. The distribution of specialist visits is shown in Table 5.

TABLE 5

Distribution of Specialist Visits

Specialty	% of population seen by specialist	% of total spec. visits
Eye (Ophthalmology and Optometry)	19	46
Dermatology	3	13
Ear, Nose, & Throat	3	12
Pediatric Surgery	3	10
Orthopedics	3	10
Allergy	1	6
Neurology	0.5	2
Psychiatry and Mental Hygiene	0.5	1
Urology	0.5	1

E. Other Utilization Variables: 1% of the sample population had permanent chronic conditions; these may or may not have resulted in a sizable proportion of the patient's visits and included such conditions as diabetes mellitus and multiple congenital anomalies. 2.5% had transient conditions that resulted in a large proportion of visits in the study year but which may be anticipated not to cause a large number of visits in succeeding years. A common example of this type of condition was a plantar wart which was often removed over the course of five or six visits.

There were 8 hospitalizations in the sample group, resulting in a total of 33 days or 8.2 hospital days per 100 children. Three of the admissions were to the YHP Intermediate Care Facility and five were to the Yale-New Haven Hospital. Four were one day admissions. The ICF admissions were for fever (2), and periorbital edema; YNHH admissions were for appendectomy (2), herniorrhaphy, PE tube placement, and pneumonia (22 days).

F. Sickness and Health Visits: If visits to the eye service and allergy clinic were considered as preventive visits, as indeed most of them were, then 35% of all visits, an average of 1.1 per child, were made for routine and preventive care. Visits for illness, including follow-up visits and specialist visits except eye and allergy accounted for 65% of the total visits, roughly 2 visits per child per year. 55% of children who made visits were seen first for a routine physical examination. The other 45% had a specific problem that prompted their first visit.

III. CORRELATES OF TOTAL VISITS

The original sample was divided into thirds on the basis of the total number of visits adjusted for length of enrollment ("adjusted visits"). This division resulted in a slightly larger upper "third" when applied to the full study group of 502 children (Table 3); 39% of this group made 4 or more adjusted visits compared to 36% of the original sample, but this difference was not significant. The mean number of adjusted visits was 3.5 for the full group, slightly higher than the sample group mean; again the difference was not significant. The effects of the various demographic parameters on the number of visits was examined with the following findings:

A. Child's Age: This proved to be the major correlate of total visits. As expected younger children made more visits on the average than older children (Table 6) and fell more often into the upper third of the visit distribution (Table 7). 3-5 year olds, who made up 35% of the population, accounted for 41% of visits, while 9-11 year olds, 30% of the population, made only 23% of total visits. Table 6 shows the mean adjusted visits for each age group; the differences were signifi-

cant ($p < .05$) between the oldest group and the two younger groups but not between the oldest and the middle group.

TABLE 6

Mean adjusted visits ± s.d.

all children	3.5 ± 3.5
3-5	4.0 ± 3.5
6-8	3.6 ± 4.0
9-11	2.7 ± 2.5

As shown in Table 7 the youngest children were most likely to make 4 or more visits while the oldest children were most likely to make less than 2 visits.

TABLE 7

Distribution of visits by age, by % of age group per visit number

Adjusted visits	3-5 yrs.	6-8 yrs.	9-11 yrs.	total
<2	21	32	40	30
2-3.9	32	31	31	31
≥4	48	38	29	39
n =	177	177	148	502

Chi square, $p = 0.002$

It appeared that younger children made more total visits largely because they made more unscheduled visits than older children. The distribution of visit types is shown in Tables 8 and 9; it can be seen that although young children had more check-ups and diagnostic visits, their over-all percentage of the total scheduled visits was not far out of proportion to their distribution in the population. Young children

TABLE 8

Distribution of visits by type, by % of visits per type by age group

A. Scheduled

age	*check-up	diagnostic	follow-up	immunizations
3-5	42	50	21	42
6-8	33	23	42	12
9-11	25	27	38	46
n =	387	30	53	24

B. Unscheduled

age	trauma	rash	*fever/ cough	*ear	throat	*pain	*other urgent	*cold	follow -up	non urgent
3-5	36	36	60	47	38	40	48	58	41	42
6-8	33	45	30	40	40	21	38	30	42	44
9-11	32	19	10	13	21	40	14	11	16	14
n =	104	53	83	137	174	38	87	53	80	69

* Chi square, $p < 0.05$

made fewer specialist visits than older children. In almost all categories of walk-in visits, however, younger children accounted for a far greater share than older children.

TABLE 9

Distribution of visits by type, by % of total made by age group

age	scheduled	unscheduled	specialist
3-5	40	44	29
6-8	32	38	36
9-11	28	18	35
n =	494	878	259

To determine whether the effect of age was in part a function of a third variable, the age groups were broken down by mother's age and by parent's university status. When children of different ages were compared within university status groups, younger children still made more visits than older children although the distribution was significant only for faculty and student children. When age was compared within maternal age groups the effect of child's age was no longer significant; the inverse relationship between age and visits was still apparent, although less so for older mothers, but the numbers in many of the cells were too small to achieve statistical significance. Determination of partial correlation coefficients gave a small but highly significant zero order coefficient between age and visits, and this remained essentially unchanged and significant when controlled for maternal age or university status. It thus appeared that child's age was an important and independent variable in determining the number of visits made.

B. Sex: Although there was a slight tendency for males to make more visits than females, the differences were not significant.

C. Age of Parents: The ages of a child's parents were inversely related to the number of visits he made; this held true for paternal ages as well as maternal ages but only the data for maternal ages will be shown here. Table 10 shows the relationship between adjusted visits and maternal age group; differences in means were significant only between the youngest and oldest groups ($p < .02$).

TABLE 10

Mean adjusted visits ± s.d. for maternal age groups

<30	4.1 ± 3.7
30-39	3.4 ± 3.5
≥40	3.0 ± 2.8

Children with young parents more often fell into the upper third of the visit distribution while the opposite was true for children with older parents. 45% of children with mothers under 30 made 4 or more visits during the year while 40% of children whose mothers were 36 or older made less than 2 visits.

Maternal age and child's age are often directly related, and as seen above younger children were apt to make more visits than older children. When mothers of different ages were compared with children in the same age group, the effect of maternal age was no longer significant although it still appeared to play a minor role in the youngest age group. Determination of partial correlations indicated that the significant negative correlation between maternal age and number of visits was insignificant when controlled for the age of the child.

D. University Status of Parent: Children of students made significantly ($p < .01$) more visits than children of either faculty members or employees. The differences between means for faculty and employee children were not significant.

TABLE 11

Mean adjusted visits ± s.d.
for university status

student	4.3 ± 4.3
faculty	3.2 ± 3.2
employee	3.1 ± 2.8

Since 45% of student children were in the 3-5 age group, it was thought that the differences observed might be on the basis of age. When the effect of university status was examined for a given age group, however, the utilization by student children remained significantly different in the youngest age group. In this group student children seemed to occupy the extremes more than other children; while nearly 60% of 3-5 year old student children made 4 or more visits compared with about 40% for the other two groups, another 25% of student children in this age group made less than 2 visits compared with 18% of non-student 3-5 year olds ($p = 0.024$).

When the effect of university status was examined within a maternal age group, it was significant only for the youngest group of mothers; young faculty mothers made the largest number of visits. This may also have been an effect of child's age since 71% of faculty mothers under 30 had 3-5 year old children while only about half of non-faculty mothers under 30 had young children. Determination of partial correlations showed only a very small correlation between number of visits and uni-

versity status which was reduced to negligibility and insignificance when controlled for either or both child's age and maternal age. All in all it appeared that the influence of university status on visits was for the most part a function of other variables.

E. Parent Associated with Yale: Although children whose fathers were associated with Yale had a slightly higher mean number of visits than children whose mothers were associated with the university, the difference was not significant. In only 12% of families was the mother the parent associated with Yale, and this number was too small to allow meaningful comparisons.

F. Number of Siblings: The number of siblings appeared to be inversely related to the number of visits but the differences in means were not significant. The total numbers of visits made by each family size group were roughly proportional to their numbers in the population. The distribution of visits by family size, however, did show significant variation, with children from large families being most likely to make less than 2 visits and children with one or two siblings being least likely to make less than 2 visits. Children with three or more siblings were also least likely to make four or more visits ($p = .04$).

Again the influence of family size was thought to be partially related to age; significantly more children with no siblings were in the youngest age group than children with 1 or 2 siblings, and large families had the fewest children in the 3-5 group. When controlled for age, the negative correlation between visits and family size was eliminated; the correlation remained significant when controlled for maternal age.

G. Family Habit: 204 children had at least one sibling included

in the study group; 94 families had 2 or more children included. There was a strong tendency for children in the same family to have a similar number of total visits. In 19% of these families, both or all of the children made the same number of visits, in 42% of families, two children were within one visit of each other in total, and in 10% of families children were within 2 visits in total. All in all 72% of children with one sibling in the study were within 2 visits of the sibling's total number of visits. It appeared that families established a utilization pattern for the whole family, although the influence of age on the establishment of that pattern could not be determined.

H. Summary of Correlates of Total Visits: Age of child seemed to be the major correlate of total number of visits, with younger children making more visits during the year than older children. The influence of age was particularly apparent in the number of unscheduled pediatric visits and not so apparent in the scheduled pediatric visits and specialist visits. Parental ages, university status, and family size seemed related in minor ways to the number of visits but for the most part their influence was a function of child's age. The pattern of utilization within a family appeared to influence the number of visits as well, but this was not controlled for the effect of children's ages within the family.

IV. CORRELATES OF SCHEDULED PEDIATRIC VISITS

The mean number of scheduled visits per child per year, adjusted for length of enrollment, was 1.0. 30% of children made no scheduled pediatric visits during the year while 18% made 2 or more. Of the children who made at least one YHP visit during the year, 18% made no

scheduled pediatric visits. Over three-quarters of the scheduled visits were for routine physical examinations.

A. Child's Age: As seen in Table 9 (p. 37), the youngest children, who made up 35% of the sample, accounted for 40% of scheduled visits. Their mean number of scheduled visits was slightly but not significantly higher than the two older groups. Younger children, however, were significantly ($p < .01$) more likely than older children to make scheduled pediatric visits (Table 12).

TABLE 12

% making 1 or more scheduled visits, by age group

	3-5 yrs.	6-8 yrs.	9-11 yrs.
all children	79	68	63
children with ≥1 YHP visit	88	79	78

B. Other Variables: Scheduled visits also showed significant variation with university status, student children averaging significantly ($p < .01$) more visits than either faculty or employee children. The number of siblings was also influential; of children with at least one YHP visit, 28% of those from large families and only 17% of those from families with less than four children made no scheduled visits.

Since routine physical examinations made up such a large portion of scheduled visits, these correlates will be explored more fully in the discussion of patterns of preventive care. The other types of scheduled visits were too few in number to allow further analysis.

V. CORRELATES OF UNSCHEDULED VISITS

878 unscheduled pediatric visits were observed in the study; 73% of these occurred during office hours. 34% of the study group (Table 3) made no unscheduled visits while 43% made 2 or more; the mean was 1.8. This represented a slightly higher number of unscheduled visits than observed for the original sample (Table 2). The distribution of visit types was similar to the original sample, although there was a slightly smaller proportion of non-urgent and follow-up visits.

TABLE 13

Distribution of visits, by % of population with visit number

visits	daytime	after-hours	total unscheduled
0	42	71	34
≥2	32	4	43
≥3	9	1	24
≥4	*	*	10

* not determined

The mean number of daytime walk-ins, adjusted for enrollment length, was 1.4, higher than the mean for scheduled pediatric visits. Again the influence of various parameters on daytime walk-ins was examined.

A. Child's Age: This was the most significant factor in determining the number of unscheduled daytime visits; age was inversely related to number of walk-in visits. Children 3-5 years old accounted for 44% of total unscheduled visits (Table 9), and children in this age group were twice as likely as 9-11 year olds to make two or more walk-ins. Table 14 compares the mean adjusted walk-in visits for the various age groups; the differences in means were significant ($p < .001$)

between the oldest group and the two younger groups but not between the youngest and middle groups.

TABLE 14

Mean adjusted day-time walk-in visits ± s.d., by age	
3-5	1.8 ± 1.9
6-8	1.5 ± 2.1
9-11	0.8 ± 1.2

The effect of child's age was largely independent of maternal age although in the middle age group younger mothers still appeared to make more visits than older mothers; this finding was of border-line significance. Partial correlation analysis showed a small but highly significant negative correlation between child's age and walk-in visits which was affected only slightly by controlling for maternal age.

B. Age of Parents: Children whose mothers were under 30 made significantly more walk-in visits during office hours than children whose mothers were 30 or older ($p < .05$). 42% of children with young mothers made 2 or more walk-in visits while only 30% of children with mothers 30 or older made 2 or more ($p = .02$). There was a very small negative correlation between maternal age and walk-in visits which disappeared when controlled for child's age. The apparent effect of maternal age seems therefore to be largely a function of child's age rather than an independent effect.

C. University Status of Parent: Student children had a significantly higher mean number of day-time walk-in visits than either faculty or employee children; the difference between means for faculty and employee children was small and not significant. Student children

were no more likely than others to make 2 or more walk-in visits even though they were generally younger children; a smaller proportion of student children than non-student children made no walk-ins, however, and their higher mean number seems due to more individuals making visits rather than to more visits by individuals. Determination of partial correlation coefficients showed no correlation at all between university status and walk-in visits.

D. Reason for First Visit: Children who made 2 or more walk-in visits were more likely than others to have a specific reason for their first visit. Even so 40% with 2 or more walk-ins made their first visit for a check-up.

E. Other Variables: No significant differences in the number of walk-in visits on the basis of sex or number of siblings were observed.

F. Summary: Child's age was clearly the major correlate of walk-in visits, with the number of visits inversely related to age. This was generally true for every type of walk-in visit (Table 8.); only in the classes of "pain" and "trauma" did the oldest group of children account for a significant proportion of the visits.

VI. CORRELATES OF PREVENTIVE CARE PATTERNS

Almost all children in the study were up-to-date on immunizations before joining the Health Plan; of the few immunization visits observed, the majority were rubella vaccines apparently required by the public schools, and many of these were walk-in visits. Immunization visits, therefore, did not seem to be a clear indicator of attitudes toward preventive care. By the same token many eye visits were for routine examinations, but this was a particularly crowded

service and for the short period of time covered by this study was not felt to represent attitudes toward preventive care well either. Correlates of preventive care were consequently assessed as a function of visits for routine check-ups. A total of 387 check-ups were observed in the study, a mean of 0.8. 32% of the population had no physical examination during the year; 20% of those with at least 1 YHP visit did not receive a complete physical examination. The effects of the following variables were examined:

A. Child's Age: Younger children accounted for a significantly greater proportion of the total well-child visits than older children ($p < .05$) and were more likely than older children to have had a check-up during the year. Of children who made at least one YHP visit, 84% of 3-5 year olds, 77% of 6-8 year olds, and 74% of 9-11 year olds received a complete physical examination; this difference was of border-line significance ($p < .1$), however. The partial correlation of age with preventive visits remained significant when controlled for maternal age, university status, and number of siblings.

B. Age of Parents: Significantly fewer children with older mothers received check-ups than did children with young mothers. This appeared to be chiefly a function of child's age, however; there was a small negative correlation between maternal age and preventive visits which was unaffected by university status or number of siblings but disappeared when controlled for child's age.

C. University Status of Parent: Although 85% of student children with YHP visits had well-child visits compared to 79% of faculty children and 73% of employee children, this difference was of only borderline significance ($p < .075$). The small correlation coefficient

was no longer observed when controlled for either child's age or maternal age.

D. Number of Siblings: Among children who made at least one YHP visit, those with 1 or 2 siblings had a significantly better record of preventive care visits than those with either no siblings or more than two siblings; only children in turn fared better than children from large families. 82% of children with 1-2 siblings, 73% of children with no siblings, and 68% of those with three or more siblings made well-child visits during the year ($p = .02$). This too appeared to be largely a function of age when partial correlation coefficients were examined. Since children with no siblings were generally younger than children with 1-2 siblings, however, their relatively poor showing in this area is not entirely explained by age effects. When cross-tabulated controlling for age, the same relationship of preventive visits to sibling number held for all ages but the numbers involved were too small to achieve statistical significance.

E. Summary: A high percentage of all groups studied had had at least one well-child visit during the year. While reviewing the charts several other children were observed who had physical examinations just after the study ended in July, and it seems clear that the subscriber population as a whole was highly oriented toward preventive care. Once again child's age appeared to be the dominant correlate of this utilization pattern; maternal age and university status were not important when the effect of age was controlled, and no differences by sex were observed. Although the number of siblings seemed to play a role independent of age, this could not be substatiated statistically.

VII. CORRELATES OF NON-USE

13.5% of the entire study group made no YHP visits during the first year, about the same proportion observed in the original sample group.

A. Child's Age: This was the only variable significantly correlated with non-use. 9-11 year olds were about twice as likely to be non-users as 3-5 year olds.

TABLE 15

% of non-users per age group

3-5	9.6
6-8	12.9
9-11	19.0

Chi square, $p < .05$

B. Number of Siblings: Although number of siblings appeared to affect the incidence of non-use, its effect was of only borderline significance ($p < .09$). Children with no siblings had the highest proportion of non-users, 21%, while children with 1-2 siblings had the lowest proportion, 12%. This observation cannot be explained on the basis of age since only children were younger than others on the average; it may represent an independent variable but the numbers involved in this study are too small for further elucidation.

C. Family Habit: 23 children, representing 12 of the 94 families in the study, were non-users. In 8 of these families, all children in the study were non-users, and 75% of children who had a sibling who was a non-user were themselves non-users. However half of the non-users from these families were in the oldest age bracket and

only 15% were in the youngest group. Thus child's age may well have been the major influence in determining family habit, at least with respect to non-use.

D. Other Variables: The incidence of non-use showed no significant variations with sex, parental age, length of enrollment, or university status.

E. Summary: The incidence of non-use was found to be directly related to the child's age. Children with no siblings also had a relatively high incidence of non-use but this difference was not statistically significant. Other variables did not exert a significant influence on this pattern of utilization.

VIII. CORRELATES OF HEAVY USE

About 10% of the original sample made more than 6 adjusted visits during the year. This 10% was arbitrarily defined as the heavy user group; this definition resulted in about 14% of the entire study group being considered to be heavy users. The heavy utilizers accounted for 38% of all visits. They were compared with the rest of the population to determine whether they differed in any particular characteristics:

A. Child's Age: Younger children appeared more likely to be heavy users than older children; 18% of the 3-5 group, 14% of the 6-8 group, and 10% of the 9-11 group were heavy users. Because of the small number of heavy users (70 children), however, the differences between age groups were not significant. The visit patterns for age groups (Tables 8 & 9) did not vary between heavy users and others. Within the heavy use group, total visits by age group were

were proportional to the age distribution in the group. A small negative correlation between age and heavy use was not apparent when controlled for either maternal age or university status. Thus in contrast to other utilization patterns, age did not appear to be of major importance in determining heavy use, although a larger study might have found it to be more significant.

B. Age of Parents: Significantly more children with mothers under 30 (22%) were heavy users than children with mothers 30 or older (11%); the same relationship was true for paternal age ($p < .02$). This relationship held for all ages of children but the numbers were too small to achieve statistical significance. The partial correlation coefficient between maternal age and heavy use was reduced only slightly and retained its significance when controlled for child's age.

C. University Status of Parent: Student children were significantly more likely to be in the heavy use group;22% were heavy users compared to 11% of non-student children ($p = .01$). When the effect of university status was observed for a given age group, student children ranked significantly higher than non-students in the 6-8 range, higher in the 5-7 range, and the same in the 9-11 range. The partial correlation coefficient between university status and heavy use appeared to be more dependent on maternal age than age group but remained significant when controlled for either and almost significant when controlled for both. The number of heavy users was too small to define the interrelationships between child's age, maternal age, and university status any further; maternal age seemed to be the dominant variable.

D. Number of Siblings: Children with no siblings were twice as likely to be heavy users than children with one or more siblings; 26%

with no siblings were heavy users compared with 13% of children from larger families ($p = .052$). Since 50% of the mothers of only children are under 30 it was thought that this difference might have been on the basis of maternal age. When heavy users were compared for family size within a given maternal age group, it was found that children with no siblings were most likely to be heavy users regardless of maternal age, children with three or more siblings were least likely to be heavy users regardless of maternal age, but children with 1-2 siblings were as likely as only children to be heavy users if their mothers were under 30 and only half as likely to be heavy users if their mothers were over 30. The partial correlation analysis implied the apparent effect of sibling number was a function largely of maternal age.

E. Family Habit: 11% of the 204 children in the 94 families in the study were heavy users, and in only 3 families were both children heavy users. Only 16% of the siblings of heavy users were within two visits of the heavy user's total, compared with 72% for the whole family population (see section III above). Clearly family habit did not produce heavy users.

F. Chronic Conditions: Significantly more of the heavy users, 16%, had chronic conditions than the was found in the rest of the population (1.6%). These figures, however, represented about equal numbers of children, and of children with chronic conditions, only 60% were heavy users. Fully 11% of the heavy users were children with non-permanent conditions; these children presumably will not be recurrent heavy users. The children with chronic conditions did not alter the over-all patterns of heavy use.

G. Summary: In contrast to other utilization patterns studied, heavy use was most strongly influenced by maternal age. Because of the small number of children involved in the heavy use group, other variables were difficult to separate from each other; number of siblings and university status appeared to have some independent effect but these could not be determined with certainty. Child's age and family habit did not appear from this study to be significant variables in determining heavy use. Many of the heavy users had some chronic condition but the majority of these were not permanent.

IX. UTILIZATION PATTERNS OF HEAVY USERS

The heavy users, 14% of the population, accounted for 38% of total visits observed. Their disproportionate share was apparent in all types of visits (Table 16), but walk-in visits, the largest single category, accounted for a large part of their disproportionate share.

TABLE 16

Share of visits by type, in % of total, by user group

Visit type	Heavy users (>6 visits)	all others (≤6 visits)
Scheduled pediatric	25	75
Specialist	43	57
Unscheduled (day)	44	56
Unscheduled (night)	42	58
Unscheduled (all)	43	57
Total visits	38	62

The heavy users accounted for a comparatively small share of the scheduled pediatric visits. This was largely due to their making only their fair share (20%) of well-child visits which in turn accounted for over three-quarters of the total scheduled visits; in the problem-oriented scheduled visits, for diagnosis and follow-up, heavy users made a much larger share of the visits, 50% and 45% respectively.

87% of heavy users made 2 or more daytime walk-in visits, and for 65% of heavy users, unscheduled visits accounted for more than half the total visits made. As indicated in Table 17, heavy users were not so much over-represented in the non-urgent walk-in categories as in the acute problem categories such as ear and throat infections, and in the follow-up visits. This suggested that heavy users might have been sick more often than others - they appeared more often for treatment and follow-up than for trivial or routine causes.

TABLE 17

Share of Unscheduled visits by type, % of total by user group

visit type	Heavy users (>6 visits)	all others (≤6 visits)
trauma	36	64
rash	36	64
fever/cough	46	54
earache	46	54
sore throat	41	59
pain	40	60
other urgent	55	45
cold	36	64
follow-up	66	35
non-urgent	36	54
total unscheduled	43	57

Not only did heavy users account for the largest proportions of visits in illness categories, but as seen in Table 18 heavy users as individuals also got sick more often. 64% of heavy users had a specific complaint on their initial visit.

TABLE 18

% with ≥ 1 visit for given complaint, by user group

visit type	heavy users (>6 visits)	all others (≤6 visits)
trauma	36	15
rash	23	8
fever/cough	36	10
earache	40	14
sore throat	54	19
pain	20	5
other urgent	36	9
cold	26	7
follow-up	43	7
non-urgent	27	19

Table 18 indicates heavy users were more apt to receive follow-up care than others as well as being more likely to get sick; there was no way of determining whether this was because their illnesses more often required follow-up or because they were more likely than others to keep follow-up appointments. Subtracting the visits by children with chronic conditions from those of the other heavy users, however, did not significantly alter the distribution of visits, even though chronic conditions might have been expected to account for a number of the follow-up visits.

Although heavy users made more visits for illness than others, total illness visits for this group accounted for only 53% of their

total visits; this was only slightly higher than the 46% of visits for acute illness episodes made by the rest of the population. In other words more frequent and widespread illnesses among the heavy user group did not account entirely for their large share of total visits.

The heavy users did in fact make a larger number of well-child visits than others; 87% of heavy users had one or more check-ups during the year compared to 65% of other children. Heavy users were also more likely than others to see a specialist. 61% of heavy users saw at least one specialist during the year and 13% saw two different specialists; only 26% of other children saw one specialist and 1% saw more than one.

Heavy users, then, had increased numbers of visits in all categories. They had more illness visits than other children, but they made more preventive and specialist visits as well, and they received more follow-up care for their illnesses. They represented a relatively "well-behaved" group, however, in that 49% of their visits were walk-in visits, while 62% of visits by the other children were unscheduled. There was no evidence that this group represented a group abusive of physician's time or the health care facilities; their visits for the most part seemed based on real problems rather than trivial demands for excessive amounts of attention.

X. CORRELATES OF PATIENTS MAKING FREQUENT UNSCHEDULED VISITS

Children who made more unscheduled than scheduled pediatric and specialist visits together were compared with children in whom no more than half the visits were unscheduled. Children with no visits

were not included in the tabulations. 40% of children who made one or more visits made more than 50% unscheduled visits; this 40% accounted for 71% of all walk-in visits, divided between daytime and after-hours visits on the same ratio as the entire population.

A. Child's Age: Once again child's age proved to be the major independent variable, with the largest number with frequent walk-ins among the young; half the 3-5 year olds, 41% of 6-8 year olds, and 27% of 9-11 year olds made more than half unscheduled visits ($p = .001$).

B. Other Variables: No significant differences on the basis of sex, parental age, university status, or family size were observed.

XI. UTILIZATION PATTERNS OF PATIENTS MAKING FREQUENT UNSCHEDULED VISITS

26% of children making frequent walk-in visits were also heavy users while 66% of the heavy users made more than half walk-in visits. Heavy users with frequent unscheduled visits were concentrated in the two youngest age groups where almost three-fourths of heavy users also made frequent walk-ins; only a third of 9-11 year old heavy utilizers made frequent walk-in visits.

Children with a high proportion of unscheduled visits accounted for a disproportionate share of all types of walk-in visits, ranging from a high of 80% of follow-up visits to a low of 60% of non-urgent visits. Like the heavy users a larger percentage of those with frequent walk-ins made visits in each category as well as accounting for a larger share. In other words, children with frequent unscheduled visits were more likely than others to have more than one illness during the year; by YHP accounting methods, acute illness visits were almost always walk-in visits. Thus children with a high proportion of un-

scheduled visits appeared to represent a group with a high level of illness rather than a group who abused the service or were inconsiderate of staff time.

XII. CORRELATES OF NON-URGENT VISITS

69 visits, 8% of the unscheduled visits, were considered by relatively conservative criteria to be non-urgent. Age was a major correlate of patients making non-urgent visits; 9-11 year olds accounted for only 14% of non-urgent visits, and the younger two groups made about equal numbers of non-urgent visits. Heavy users and children with a high proportion of walk-ins were more likely than others to make non-urgent visits, but their share of these visits, although greater than their proportion in the population, was not so great as for other visit types. Few children made more than one non-urgent visit. The non-urgent visits thus appeared to be distributed in the population in much the same ratio as the non-trivial visits, and no particular group stood out as being most likely to make non-urgent visits.

XIII. SUMMARY

Child's age appeared to be the principal independent variable for all patterns of utilization studied except heavy use; maternal age appeared to be more closely related to heavy use than child's age. Family size, family habits, and perhaps university status were of minor or possible influence in some utilization patterns as well. Heavy use and frequent walk-ins appeared to be related to illness patterns rather than to more intangible or psychological factors.

DISCUSSION

The aims of this study were threefold; first to define utilization patterns in the Yale Health Plan Pediatric Service, this information being both of general interest to the study of health care delivery and of particular interest to YHP; second to find correlates of observed utilization patterns which would be useful in predicting future use and in determining whether and how to attempt to change observed patterns; third to compare the YHP experience with other programs, both prepaid and fee-for-service, in hopes of reaching some conclusions about the efficacy of prepaid group practice as a vehicle for health care delivery.

It was hypothesized, on the basis of findings in similar studies, that utilization patterns in YHP would not in fact be greatly different from patterns observed elsewhere, regardless of financial arrangement, but that variation, if observed, would be in the direction of fewer non-users and more preventive care visits rather than in the direction of more heavy users or more non-urgent visits. It was further hypothesized that it would be possible to characterize those subscribers with heavy use, non-use, or frequent walk-in utilization patterns. A third hypothesis was that variations in utilization patterns would be observed among the various YHP subgroups. Findings in other studies, for example, led to the expectation that age, sex, family size, and family education and income might all influence utilization; it was hoped that university status would provide a rough indication of the latter two factors. It was the impression of the YHP staff that student children seemed to have a higher rate of walk-in visits than

other groups. Because they were likely to be less mature and less independent than older parents, younger parents were also expected to show a higher rate of both over-all visits and walk-in visits. Faculty parents, representing a high-income, highly educated group, were expected to have a relatively high proportion of preventive care visits and a high number of total visits. By testing these particular predictions and perhaps discovering unsuspected patterns, it was hoped that information could be gained that would be useful in predicting and planning for future YHP utilization.

The group used for determining utilization patterns was the random sample (Table 2, page 28) encompassing about one quarter of children between the ages of three and eleven. Correlates of utilization patterns were determined using the full sample of 502 children (Table 3, page 29), 38% of the eligible population; 100% of student children eligible were included in the study. Information is not yet available from YHP for determining how closely the characteristics of this group represent those of the whole pediatric population or even this particular age group. The sample appeared to be sufficiently large, however, to be both significant in its own right and reasonably representative of the group from which it was drawn.

As predicted, YHP subscribers did not vary greatly from other children in their utilization of pediatric services. The mean number of visits, 3.2 when adjusted for length of enrollment, was slightly lower than that observed in studies discussed earlier, although the age groupings and criteria for counting visits were not strictly comparable. Physician visits per child per year for all children in 1966-67, for example, was reported to be 3.6.[26] A possible reason for the

lower average found in this study lies in the observation, both from the current study and others cited above, that age is inversely and almost linearly related to utilization. It is likely that had the study involved children up to age 18, the mean number of visits would have been lower still; if, on the other hand, the study had involved children under 6 years only, the mean might have been significantly higher. The over-all YHP average for the first year was 6.2 visits per member per year, almost twice that observed in this study[2]; although this figure included radiological services which the current study did not include, only a few radiology visits were made by the children studied, and the average would not have been greatly increased by including them. Interestingly the youngest group of adults in YHP, the student population, made a slightly higher average number of visits than the rest of the population. Clearly other factors are operating in the adult utilization patterns which are beyond the scope of this study; they may be peculiar to the university setting of YHP or due to the "testing" of a new program by members. The Columbia Plan in Maryland, which also included an affluent, highly educated population in many ways resembling the Yale community, reported an even higher rate, 8.0 visits per year per member, for its first year of operation; mean visits by 3-10 year olds ranged from 9.6 for the younger children to 6.7 for the older age group during the year.[20]

Age emerged as the major correlate of utilization, with younger children making more visits than older children. The reasons for the inverse correlation appeared to lie chiefly in the high incidence of acute illness visits in the younger age groups. The preschool years are classically filled with otitis media, viral gastroenteritis, fevers,

minor respiratory ailments, and runny noses. But it is in this age group too that minor symptoms can become major and even life-threatening in a short period of time, a fact well known to parents as well as to pediatricians. It is likely that not only are younger children sick more often, but that their parents are also more apt to seek medical attention when they are, and the pediatrician is more apt to see the child rather than make a diagnosis over the telephone. As the child grows older, the parents become more experienced in handling minor problems, and they, along with the pediatrician, also become more confident of the outcome; illnesses become less frequent as well. It is not surprising, therefore, that age is inversely related to the total number of physician visits in the childhood years.

The finding that number of visits was most closely related to age, and was not related to parental ages, number of siblings, or sex, was consistent with the findings of the study by Salber and associates which reported that such factors as race, family size, income, and education of the mother were much less important than child's age in influencing utilization;[30] the group involved was a homogeneous lower-class group, however. The failure to observe any clear independent effect of university status on YHP utilization suggested that it was a relatively poor indicator of either income or educational level, since the evidence that both these factors are important correlates of utilization patterns in children has been well established in a number of studies discussed previously.

The socioeconomic characteristics of the employees who joined the plan have not been determined, but it is highly likely that many are white-collar employees on a par economically and educationally with fac-

ulty members, and would consequently be expected to have similar utilization patterns. Families with relatively low incomes may have been less likely to enroll; cost was a factor frequently mentioned as a reason for not joining,[5] and families with low incomes might have preferred to gamble on good health rather than prepayment. Undoubtedly cost prevented many student families, not included in the Davie study, from joining as well. The results of the present study may be somewhat skewed, therefore, in the direction of families sufficiently committed to the principles of preventive medicine to be willing to invest relatively large monthly sums in advance, or who anticipate a significant need for medical care. This tendency of prepayment programs to select for heavier users has been previously discussed and the issue remains uncertain. Children in families who did join YHP, however, demonstrated an overall utilization rate quite on a par with other studies involving both prepaid and fee-for-service arrangements. Although in contrast with these other studies, socioeconomic status was not shown here to be an important determinant of utilization, the parameters available for its measurement were clearly inadequate.

This study did not explore the question of whether children with an older sibling whose parents were consequently somewhat experienced in handling childhood illnesses were likely to have fewer visits than other children of the same age. Children with no siblings were not found to make more visits than others, however, when the effect of age was controlled. It was also found that children tended to make about the same number of visits as their siblings; this may be due in part to the tendency of children to share their various infections with their brothers and sisters, but it implies as well that parents develop a

consistent pattern of response to illness in their children, whether that response is a YHP visit, a telephone call, or simple supportive home remedies.

While it was predicted and demonstrated that the over-all utilization would not vary greatly from utilization in other types of health services, it was expected that some variation might occur in the direction of finding fewer non-users enrolled in YHP than observed elsewhere. This prediction was based on the findings in a number of studies, discussed above, showing that prepaid programs tend to have fewer non-users than other programs, and on the assumption that the opening, amid much fanfare, of a new health plan in a new building would provide additional incentive to subscribers to establish some contact with their new doctor or at least to come see for themselves what all the fuss was about. This was in fact the case; only 15% of children studied made no visits during the first year. Although the age groupings were not strictly comparable, the proportion of non-users in other studies ranged from 20 to 40%.[12,29,38] Only Salber's study, where 10% of 3-11 year olds in a neighborhood health center received no services during the year, and Avnet's study, where 7% of GHI children under 9 received no services during the year, showed lower rates of non-use, and both included a number of services such as dental care and laboratory work that were not included in the present study.[28,30] Whether YHP non-utilization will increase as the novelty of the plan wears off remains to be seen; if HIP experience is any guide, however, non-use should not be expected to exceed 20% in any given year.[38]

Age was the principal correlate of non-use, with the oldest children being twice as likely as the youngest children to make no YHP vis-

its during the year. This relationship has been found by other observers as well[28,29,30] and is apparently related both to the decreased amount of acute illness, or at least illness visits, among older children and to the decreased number of well-child visits. Non-use was also a family habit, and non-users often had siblings who were non-users although this was somewhat age related as well. Whether these families did not accept the dogma of "the yearly physical" or had simply been slow to make their appointments was unclear. Nearly half of HIP non-users in the pediatric age group were non-users in the following year;[38] this implies non-use represents at least in part a lack of acceptance of the annual check-up as a minimum standard of preventive care in a group of healthy individuals. This will be discussed further in relation to the utilization of preventive services.

Although non-utilization at YHP was lower than average, as predicted, heavy utilization was not proportionately increased. Only 10% of the randomly selected children made more than 6 visits, and only 25% made more than 4; the corresponding 10% of HIP children made 10 or more visits.[38] In comparison with the other studies previously discussed,[12,28] heavy use at YHP has been held to the same or slightly lower levels.

The characteristics of high utilizers in other plans have not been well studied. Densen and coworkers reported a tendency, less strong in children than adults, to remain high utilizers from year to year, but were unable to identify particular factors which might have been correlated with such a tendency; they did report that family size was not related to a pattern of heavy use, however.[38] The heavy user group in the current study differed from other groups in that maternal

age appeared to be at least as important as child's age in predicting heavy use; children with young mothers were twice as likely as children with older mothers to be heavy users. Children with no siblings were also statistically more likely to be heavy users. The preponderance of young mothers and only children in the heavy use group supports the contention that heavy users represent an insecure group relatively dependent on their physicians and apt to seek medical advice for a variety of minor problems. Certainly young mothers, particularly when new to a community and far away from family sources of support, as members of a university community are apt to be, would seem especially prone to insecurity and dependency, and only children have been a group traditionally over-protected. This insecurity did not appear to extend to students as a separate group, however, even though they would be likely to be the least established in the community, the most isolated from other sources of support, and well educated to medical care requirements; it may be that the students most subject to these factors, for example foreign students, did not enroll in YHP. The role of increased need for support among heavy users was further clouded by the finding that heavy use did not appear to run in families. Insecure parents might be expected to seek frequent medical attention for all their children. Again heavy users did not account for a particularly high proportion of the non-urgent visits although this might have been expected had they represented an insecure group.

The evidence, then, that heavy utilization is the result of insecure, inexperienced, or even neurotic parents is far from clear. On the other hand, there is fairly clear evidence that heavy use is often related to more frequent episodes of illness than average. Heavy users

accounted for a high proportion of the visits for acute illnesses and their follow-up; this was consistent with the observation that many of the heavy users fell into the youngest age group where, as discussed above, illness occurs more often and is treated more often. It is possible, too, that the heavy users were more likely to seek medical attention when they were sick and to keep follow-up appointments, but a reasonable excuse for initiating physician contact seemed to have been present for most of their visits as well. There was no indication from the study that heavy users were abusing or excessively using the system, although they were undoubtedly more doctor-oriented, whether for reasons of insecurity or illness, than most, as evidenced by their relatively frequent use of preventive and specialist services as well. They seemed to represent the upper 10% of a normal distribution rather than a separate group in a bimodal distribution.

Children with temporary conditions requiring frequent visits over a period of time made up 11% of the heavy use group; these children would not be expected to remain heavy users the following year. Many of the other heavy users in any given year will grow older and less subject to frequent illness, and their parents will grow older, more experienced and confident; these children ought, therefore, to drop out of the heavy use category. Psychological factors affecting heavy use can be best determined by examining those children who remain high utilizers over a period of several years. The heavy users appear to be a heterogeneous group, and it is the habitual heavy users who are of the greatest interest in terms of reducing the number of heavy users as much as possible.

The second area of the study in which the question of excessive

use was raised was in the area of unscheduled visits, particularly walk-in visits during regular office hours. Unscheduled visits accounted for 56% of the total daytime pediatric visits. This was roughly the same proportion reported for the pediatric service as a whole,[2] and similar to the 52% reported for a study of pediatric walk-ins at a Kaiser clinic.[40] A neighborhood health center in Cleveland reported 30% walk-in visits for all ages,[41] about the same proportion seen in YHP for all ages.[2] Thus the percentage of walk-in visits at YHP was not greatly different from that observed in other comprehensive prepaid programs. It is probably slightly higher than one would expect to find in private practice, however, where patients have been well trained to call first and have a financial incentive to avoid unnecessary visits. Studies of private pediatric practice report about half of pediatric visits to be illness-related,[3,31] and undoubtedly a substantial number of these visits are for acute illness of the sort that would result in an unscheduled visit at YHP. This figure includes all ages and is therefore skewed toward more preventive visits by the inclusion of infants who receive several well-baby check-ups per year. The proportion of illness visits, many of which are on short notice, in private practice for the 3-11 age group is probably not greatly different from the 65%, the majority of which were unscheduled, observed in the present study.

In part the apparently high proportion of walk-in visits at YHP is an artifact of the technicalities of the labeling procedure; a patient whose name does not appear on the appointment list is considered to be a "walk-in". The appointment list is compiled the day before, however, so that most patients with acute problems are not included on this list

and are therefore counted as walk-ins. No distinction is made between patients who have contacted a physician prior to their visit and those who have dropped in without any advance notice. A campaign was in progress during the spring and summer months of the study to encourage patients to call before coming to the clinic; many did call first and presumably even more will do so as the effort continues. This may result in some decrease in unscheduled visits, at least among the non-urgent visits. In some cases studied, however, even apparently non-urgent walk-ins were found to have been officially sanctioned, although it is possible that a verbal appointment may have been made earlier without the appointment office's being notified. Certainly such a breakdown in communications must have been responsible for the large number of walk-in visits for follow-up care; two-thirds of all follow-up visits were unscheduled, and yet in almost all cases the patient had been given a verbal return appointment at the time of the original visit. Because no official appointment was scheduled, however, the visit was technically, and for YHP statistical purposes, a walk-in visit.

At a maximum, non-urgent and follow-up visits accounted for 28% of the total walk-in visits, including visits outside regular office hours. If follow-up visits are not considered, then non-urgent visits, including visits for colds, accounted for about 20% of the remaining walk-in visits. Weinerman and coworkers reported a much higher proportion of non-urgent visits in a study of emergency room visits; 60% of visits by 5-14 year olds were considered to be non-urgent.[42] Many patients tend to use the emergency room for routine care, however, and this figure may not be entirely comparable. It is of interest that the

non-urgent visits in the current study were fairly evenly distributed, and almost no one made more than one non-urgent visit. It is likely that most of the non-urgent visits could have been either averted or postponed and scheduled for a later time if the patient's physician had been contacted before the visit. This is the one area where the effort to encourage telephoning before a visit is likely to result in a reduction in visits.

The number of unscheduled visits made dropped off sharply with increasing age and did not appear to be influenced independently by any of the other variables studied. Young or student parents did not appear to have more frequent walk-in visits for this age group at least. Nolan and associates found a relationship between race or socioeconomic status and walk-ins, with non-white and poor patients making increased proportions of unscheduled visits; they did not determine whether this was due to an increased incidence of disease or decreased preventive care visits among these groups.[40] The evidence from the present study indicates the increased presence of disease is the more important in determining walk-in visits, since younger children, who accounted for the largest proportion of unscheduled visits for almost every type of visit, also had the largest share of preventive care visits. As discussed above, young children are particularly susceptible to the many acute conditions that make up the bulk of pediatric disease; these illnesses are usually of fairly sudden onset, requiring, if prompt treatment is to be instituted, a prompt examination without waiting for a prescheduled appointment. Perhaps some of the problems are of a nature to be dealt with over the telephone, particularly in older children, or postponed to a more convenient time, but the majority will

still require a visit which will, by administrative criteria, be considered a walk-in visit.

When children with an unusually high proportion of walk-in visits were studied to determine whether they differed in any identifiable way from other children, it was found that they differed only in being more likely to be young; this was consistent with the inverse relationship between age and walk-in visits. Again there was no evidence of a particularly insecure group of parents or patients who were likely to rush to the health center at the first sign of illness; patients with frequent walk-ins were not unusually apt to make non-urgent visits although they did account for 80% of the follow-up visits. Nor were they particularly prone to be heavy users, and only a quarter of them fell into the high use group. It is probable that the habitual walk-in group, like the heavy use group, represents merely the upper portion of a normal distribution curve; their more frequent illness accounts for their large share of unscheduled visits.

The over-all number of walk-in visits, in summary, was high but not remarkably different from the experiences of other programs and practices. The inverse relationship between illness and age appeared to offer the best explanation for the finding that age was the only variable related to the number of unscheduled visits. There was no evidence of a separate group of subscribers who relied on visits rather than telephone calls for minor or trivial problems, and no clear evidence that patients with a large number of walk-in visits could be identified by any variable other than age. The present study was unable to correlate university status with socioeconomic status, and reports that lower income resulted in a higher proportion of walk-in

visits could not be confirmed.[40] It was in this area that interviews with patients would have been particularly useful in elucidating subjective and attitudinal factors related to walk-in patterns. For the most part, however, it appears that the number of walk-in visits is not subject to a great deal of alteration, and that the so-called walk-in visits are a fact of life in pediatric practice and will continue to account for a substantial portion of YHP visits.

If excessive use and large numbers of walk-ins are problems that prepaid groups must avoid, preventive care is an area where visits can be encouraged, in the interests of both the patient and the plan. In the area of preventive care YHP was again on a par with other programs. 68% of the study group received routine health examinations during the first year of the plan; the mean was 0.8 visits per person per year with preventive visits making up 36% of all visits. This compared with a mean of 0.7 preventive visits per child per year for five to fourteen year olds reported by the 1957 National Health Survey,[24] accounting for 37% of visits by five to nine year olds in a health insurance plan.[28] Other studies of private practice, involving all age groups, reported a higher proportion with about 50% of visits for preventive care.[3,31]

As with most other utilization patterns, age proved to be the decisive variable in preventive care, younger children being more likely than older children to make a well-child visit. Yearly check-ups are recommended all through this age group, but a number of factors might influence the age-related decrease: parents tend to be concerned that young children are growing and developing normally whereas they feel they can judge the progress of older children for themselves; visits for immunizations are usually completed in the pre-school years; par-

ents may become disenchanted with the need for a yearly physical examination as their children grow older; finally, older children themselves may resist yearly visits. The important role of parental self-confidence as a negative influence on regular check-ups was supported by the finding that the children of the most experienced parents, those with four or more children, made the least number of preventive care visits; the finding that only children also had a relatively low level of preventive care, however, did not fit this explanation. Further study, using interviews to assess patient attitudes toward preventive care, would have been useful in clarifying this issue.

The YHP population is a highly-educated population undoubtedly well exposed to the philosophy of preventive care. The high, virtually universal,level of completed immunizations achieved prior to joining the health plan indicates a high level of awareness and previous pediatric care. What portion of the well-child visits were prompted by a desire merely to get acquainted with the new pediatrician, and what portion will continue to be observed in the future are subjects for further follow-up study, but it is likely that a high level of preventive care will continue in this particular population.

The general interest in preventive care shown by the YHP population carried over into the specialty services and was evidence by the high frequency of visits for eye check-ups; eye service visits accounted for nearly half the specialist visits and involved one-fifth of the study population, with the great majority of these visits being for routine visual testing and refractions. Since one out of nine children between the ages of six and eleven has defective visual acuity,[24] a proportion which increases consistently with age, the number of eye

clinic visits observed here seemed in no way excessive. The other specialist visits were scattered among various specialties and were largely due to referrals from the pediatricians. For that reason no attempt was made to correlate specialist visits with other variables. Comparative data for this age group is not available.

In terms of the original hypotheses of the study, then, a number of expectations have been realized. The utilization patterns observed at YHP have not differed greatly from patterns in other programs, in regard both to total visits and to types of visits. The proportion of non-users was smaller than that reported in a number of other studies, but there were other programs with still lower numbers of non-users. The proportion of heavy users in YHP did not appear to be greater or more extreme in terms of visit numbers than in other programs whether prepaid or fee-for-service. Characterization of subscribers with particular patterns of utilization revealed that age was the principal determinant for almost every pattern. The hypothesis that variations in utilization patterns would be observed among subgroups was supported in some groups and not in others. Division by age group did reveal variations in utilization patterns, and division by parental age produced variation in the amount of heavy use. Groupings by family size appeared to produce slight variations in preventive care and heavy use patterns, but these were hard to distinguish from age effects. On the other hand, groupings by university status produced no significant variations in utilization patterns; clearly this was a crude measure of income or educational level, and the differences in utilization on the basis of university status per se appeared to be negligible.

* * *

One of the aims of the study was to find correlates of observed utilization patterns which would be useful in predicting future use and in determining whether and how to change existing patterns. The single most important correlate of the various utilization patterns examined, however, was age. This provides a useful tool for predicting future use but is unfortunately not amenable to alteration. Thus the number of walk-in visits, for example, is not subject to a great deal of alteration beyond the limited reduction of non-urgent and follow-up visits discussed above. Only in the heavy use group where parental inexperience appeared to have some effect was there any indication that causative factors could be influenced, either by encouraging telephone contact with the physician or by special efforts of the staff to deal with insecurity in younger parents. Heavy use was also inversely related to age, however, and appeared unlikely to be significantly reduced by efforts to deal with parents. On the other hand neither walk-in visits nor total visits were found to be excessive or unreasonable for any group, and only minor modifications in utilization patterns by means discussed above need even be considered.

When YHP is viewed in light of the experience of other prepaid group practices, not only can its own experiences be seen to be fairly typical, but its future experiences can also be predicted. The health plan can expect, for example, that a certain number of subscribers will continue to call on outside sources for a part of their medical care needs. Some evidence that this already occurs was found in reviewing the charts for the present study; in several cases the child seemed to be continuing to receive routine care from his previous pediatrician but used the specialist or weekend services of the health plan. Obvi-

ously a separate study will be necessary to determine the full extent of outside use. In a university population with a high degree of geographic mobility and turnover, it might be predicted that outside use will eventually decrease as new arrivals to the community establish their first medical ties with the YHP physicians, and the relationships with private physicians that seem to encourage use of outside services are not established. This assumes, of course, that the reservations as to the quality of care expressed to Davie and coworkers are quickly dispelled.[5] In this regard YHP has some advantage over similar programs in that the university community, particularly in the faculty and student ranks, is a close-knit one, and the lay-referral system would tend to operate to the advantage of YHP if it earns a good reputation among its members.

In addition the Yale Health Plan can expect to encounter complaints among subscribers, if not of being treated as charity patients, at least of impersonal service and a clinic atmosphere. Long waiting time, either for routine appointments or in the waiting rooms, tends to encourage this type of complaint, and already these problems are frequently mentioned by subscribers. Another source of early frustration has been the centralized switchboard and chain of receptionists that seem to be significant barriers to direct contact with a physician; this unavoidable structure of a large group practice adds to the impression of impersonal care. The tendency to use YHP as a walk-in clinic, perhaps incited by the long waiting times for appointments or by the early emphasis on YHP's convenient location and around the clock availability, adds to the impersonal aspect of the plan, particularly since walk-in patients are not usually seen by "their" physician.

Relying on YHP for primary care rather than relying on a particular physician who happens to be part of YHP hinders the establishment of doctor-patient relationships that help overcome the impersonal, bureaucratic aspects of a large group practice. Simon and Rabushka found that patients who considered their plan physician to be their family doctor were likely to have had an illness requiring hospitalization or prolonged treatment, circumstances favorable to the development of emotional ties;[12] time is also needed for relationships to become established. It would seem, however, that actively encouraging contact with a particular doctor rather than with any doctor on a random basis would result in a significant reduction in the impersonal character of the program. These considerations apply to subscribers of all ages. Again subscriber opinion will need to be assessed more accurately before valid conclusions can be reached.

By and large subscribers of prepaid programs have been satisfied with their plans in spite of some of the perhaps inherent weaknesses in this form of health care delivery. Reservations have tended to disappear with time except among a "hard-core" of dissatisfied customers who seem to account for about 10% of subscribers in a number of programs.[8, 10, 12] However, since 10% of people in the Temple survey thought the quality of medical care in general was poor,[14] the unsatisfied "hard-core" may not be unique to the prepaid group type of practice. Residual complaints in prepaid programs are frequently common to medical practice in general rather than significantly related to the group practice or prepayment arrangement. Others are directed at relatively minor aspects of a particular plan, and take the form more of constructive criticism or suggestions for improved service than of criticism

of the plan per se. The Yale Health Plan has an established consumer representation to help insure that this type of complaint receives the proper attention. The likelihood, then, of eventual general satisfaction, based on the experiences of other plans and the care taken by YHP to maintain adequate channels of communication between consumers, administrators, and staff, seems high.

Within the limits of the study methods and the small part of the population sampled, in sum, the utilization patterns in the Yale Health Plan have been found to correlate, for the most part, with the observations of other studies involving many different forms of health care delivery. One of the major advantages of prepaid practice, a decreased hospitalization rate, could not be explored here because of the small size of the sample and short time period of the study. Although it cannot be established from utilization rates alone that prepaid health care is superior to fee-for-service care, it is clear that prepaid programs, both at YHP and elsewhere, succeed no less well in providing adequate and readily available preventive care without unduly encouraging unnecessary or excessive utilization; patients who pay for services in advance are fully as responsible as any other group of health care consumers. In returning to the initial question, then, as to whether prepaid group practice offers a competitive system for effective and efficient delivery of health care, the answers provided by the YHP experience, as well as by many similar and more long-standing programs, are clearly in the affirmative.

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